

What is Claimed Is:

1. An apparatus for high resolution imaging of a sample, comprising:
 - a SQUID evacuated dewar;
 - a SQUID sensor cooperating with the dewar to sense magnetic flux from the sample being imaged, said sensor having a detection coil;
 - said dewar having a thin window;
 - a mechanism for mounting the detection coil in close proximity to the thin window; and
 - a radiation shield mounted within the dewar and having an extension surrounding the detection coil to help maintain its cold temperature.
2. An apparatus according to claim 1, further including a truck backing window overlying the thin window on the vacuum side thereof.
3. An apparatus according to claim 2, wherein said backing window includes a hole therein for receiving the detection coil and the distal end of the shield extension.
4. An apparatus according to claim 3, wherein the shield extension is conical and the window hole is tapered.
5. An apparatus according to claim 1, wherein the thin window is composed of sapphire material.

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6. An apparatus according to claim 1, wherein the thick window is composed of sapphire material.
7. An apparatus according to claim 1, further including a positioning mechanism for moving the detection coil adjustably toward and away from the thin window along a substantially straight path of travel.
8. An apparatus according to claim 7, wherein the positioning mechanism includes a lever.
9. An apparatus according to claim 8, wherein said positioning mechanism includes a flexure bearing.
10. An apparatus according to claim 1, wherein said detection coil is a bare SQUID magnetometer.
11. An apparatus according to claim 10, wherein said detection coil is an all-thin film SQUID magnetometer.
12. An apparatus according to claim 1, wherein said detection coil is a magnetometer coil connected to a SQUID sensor.
13. An apparatus according to claim 1, wherein said detection coil is a first derivative gradiometer.
14. An apparatus according to claim 1, wherein said detection coil is an asymmetric gradiometer.

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15. An apparatus according to claim 1, wherein said detection coil is an apodized magnetometer coil.

16. An apparatus according to claim 1, wherein said detection coil is a vector magnetometer.

17. An apparatus according to claim 1, wherein said detection coil is a gradiometer.

18. An apparatus according to claim 1, wherein said detection coil is a fractional turn SQUID magnetometer.

19. A method of high resolution imaging of a sample, comprising:

sensing magnetic flux from the sample using a SQUID evacuated dewar and a SQUID sensor having a detection coil;

mounting the detection coil in close proximity to a thin window forming a part of the dewar; and

mounting a radiation shield within the dewar and surrounding the detection coil.

20. A method according to claim 19, further including replacing the detection coil with another detection coil.

21. A method according to claim 19, further including applying a magnetic field to the sample being imaged prior to or during said sensing.